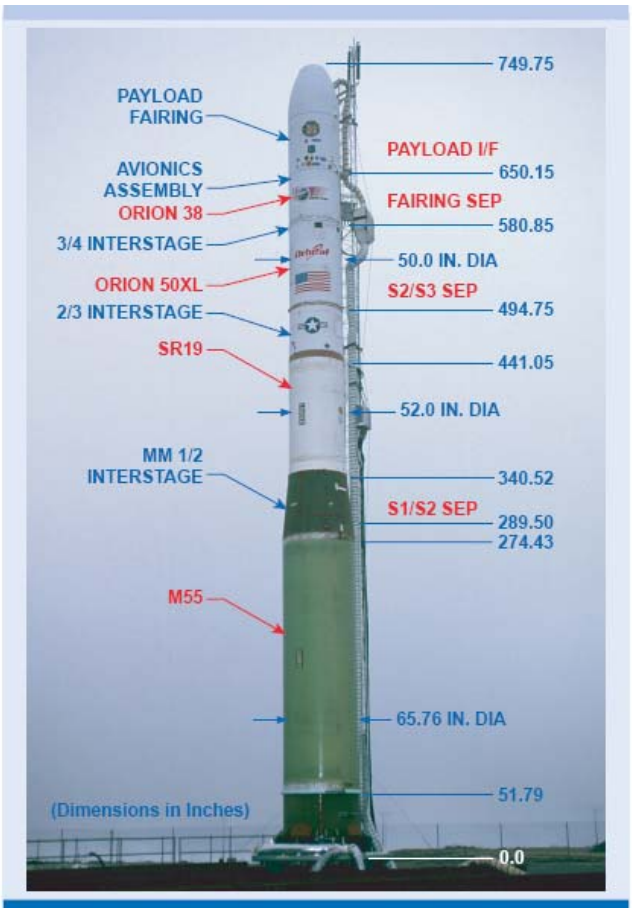
SUPPORT TO PROGRAM OPERATIONS
SUPPORT OF TOXICS AND DISTANT FOCUS OVERPRESSURE EVALUATIONS

TacSat-2: Kennedy Space Center Range Safety Support of Toxics and Distant Focus Overpressure Evaluations

TacSat-2, a small technology mission sponsored by the Air Force Research Laboratory, was launched aboard an Orbital Minotaur 1 vehicle from the Wallops Flight Facility in December 2006. The Orbital Suborbital Program Minotaur 1 launch vehicle consisted of an M-55 (51,514 pounds) and SR-19 (13,740 pounds) first and second stage taken from the Minuteman-2 as shown in the picture below. Upper stages consisted of an Orion 50XL motor and Orion-38 motor, both of Pegasus heritage.



Although launch vehicles of significant size have been launched from Wallops Flight Facility in the past, this is the first time Wallops has performed a detailed analysis of toxic and overpressure hazards. A Tier 1, or screening evaluation, of the TacSat-2 mission performed by the 45th Space Wing revealed an in-depth toxics and distant focusing overpressure analysis was required.

The close proximity of the Minotaur 1 launch vehicle (over 65,000 pounds of solid rocket propellant) to the off-base public drove the need for more detailed analysis. Based on the data requirements, first time evaluation of these hazards required a significant effort. The TacSat-2 mission was required to meet the acceptable risk criteria contained in NASA Procedural Requirement 8715.5, *Range Safety Program*.

Kennedy Space Center Range Safety volunteered to assist Wallops in evaluating the public and workforce risk due to toxics and distant focusing overpressure resulting from the TacSat-2 mission.

Kennedy Space Center Range Safety has gained a significant amount of experience in evaluating these hazards at the Eastern Range and has assisted Wallops in the development, coordination, and real-time support of toxic and distant focusing

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overpressure risk evaluations. The 45th Space Wing and ACTA Inc provided significant support to this effort.

Kennedy Space Center Range Safety assumed the lead on coordinating contractor and 45th Space Wing support, tracking task progress, leading technical discussions, and facilitating weekly telecons. Development of off-base and on-base population databases, terrain and structural databases, yield histograms, and historical meteorological files required to support a Wallops Flight Facility hazard analysis were completed.

Kennedy Space Center Range Safety also completed a distant focusing overpressure availability study and coordinated with the 45th Space Wing and ACTA to complete a toxics availability study. These availability studies aided the assessment team in determining the need for additional development of input assumptions and allowed decision makers to gain an understanding of the probability of potential launch holds.

Launch day operations support by Kennedy Space Center Range Safety consisted of running and reporting real-time distant focusing overpressure risk, coordinating with the 45th Space Wing to provide real-time toxic modeling support, and coordinating with ACTA to provide meteorological and technical support. On 16 December at 0700, TacSat-2 was successfully launched from the Mid-Atlantic Regional Spaceport on the southern tip of the Wallops Flight Facility with no concerns with respect to toxic or distant focusing overpressure risk mostly due to north westerly winds.